

CLAIMS

1. A magnetic field sensor characterized by
2 comprising a substrate, a stacked coil formed on said
3 substrate, and a strip line formed on said substrate to
4 continue to said stacked coil, wherein
5 said stacked coil comprises coil forming
6 elements respectively formed of at least two conductor
7 layers on said substrate, and contact means, formed in
8 an interlayer dielectric film interposed between said
9 conductor layers, for bringing said coil forming
10 elements on and under said interlayer dielectric film
11 into contact with each other through a via hole,
12 said strip line comprises a structure in which
13 a lower grounding layer, a lower interlayer dielectric
14 film, a strip conductor, an upper interlayer dielectric
15 film, and an upper grounding layer are stacked on said
16 substrate in an order named,
17 the number of turns of said stacked coil is
18 larger than 1,
19 one end of said stacked coil continues to
20 either one grounding layer of said lower grounding layer
21 and said upper grounding layer, and
22 the other end of said stacked coil continues
23 to said strip conductor.
2. A magnetic field sensor according to claim 1,
2 characterized in that the number of turns of said

3 stacked coil is not less than the total number of said
4 coil forming elements.

3. A magnetic field sensor according to claim 1,
2 characterized in that an outline shape of said stacked
3 coil when seen from the top is rectangular.

4. A magnetic field sensor according to claim 1,
2 characterized in that the total number of said coil
3 forming elements is one of 2 and 3.

5. A magnetic field sensor according to claim 4,
2 characterized in that of said coil forming elements,
3 with reference to said substrate, one of said coil
4 forming element which corresponds to a lowermost layer
5 and said coil forming element which corresponds to an
6 uppermost layer continues to said one grounding layer,
7 and the remaining one continues to said strip conductor.

6. A magnetic field sensor according to claim 4,
2 characterized in that
3 said one grounding layer and said coil forming
4 element which continues thereto are formed of one
5 conductor layer, and
6 said strip conductor and said coil forming
7 element which continues thereto are formed of another
8 conductor layer.

7. A magnetic field sensor according to claim 1,
2 characterized in that the total number of said coil
3 forming elements is 4.

8. A magnetic field sensor according to claim 7,

2 characterized in that
3 of said coil forming elements, with reference
4 to said substrate, one of said coil forming element
5 which corresponds to a lowermost layer and said coil
6 forming element which corresponds to an uppermost layer
7 continues to said one grounding layer,
8 extending means which continues to said strip
9 conductor is formed close to one of said three remaining
10 coil forming elements which is located at the middle,
11 and
12 the remaining one of said coil forming element
13 which corresponds to said lowermost layer and said coil
14 forming element which corresponds to said uppermost
15 layer is in contact with said extending means through a
16 via hole.

9. A magnetic field sensor according to claim 1,
2 characterized in that each of said lower grounding layer
3 and said upper grounding layer comprises a T-shaped
4 planar shape in which a line width at an end on a
5 stacked coil side is larger than a line width at another
6 region to form a rectangular region.

10. A magnetic field sensor according to claim 9,
2 characterized in that said strip conductor extends
3 through a middle point of a long side on a proximal
4 portion side of said rectangular region and a central
5 point of said rectangular region, switches a direction
6 thereof by 90° at the central point to extend along a

7 central line which extends through a middle point of a
8 short side of said rectangular region, switches a
9 direction thereof again by 90° toward said stacked coil
10 before reaching said short side, and reaches a long side
11 on a stacked coil side of said rectangular region.

11. A magnetic field sensor according to claim 9,
2 characterized in that a length of a short side of said
3 rectangular region is 4 to 8 times a line width of said
4 strip conductor.

12. A magnetic field sensor according to claim 11,
2 characterized in that a gap between an end of said strip
3 conductor on said stacked coil side and a short side
4 among short sides of said rectangular region which is
5 the closest to said end is not less than twice the line
6 width of said strip conductor.

13. A magnetic field sensor according to claim 1,
2 characterized in that each of said lower grounding layer
3 and said upper grounding layer comprises a band-like
4 planar shape.

14. A magnetic field sensor according to claim 1,
2 characterized in that a thickness of said upper
3 interlayer dielectric film on said strip conductor is
4 substantially equal to that of said lower interlayer
5 dielectric film under said strip conductor.

15. A magnetic field sensor according to claim 1,
2 characterized in that said strip line comprises a shield
3 type strip line region with an outer surface which is

4 formed of said lower grounding layer and said upper
5 grounding layer.

16. A magnetic field sensor according to claim 1,
2 characterized in that a characteristic impedance of said
3 strip line is equal to that of a high-frequency cable
4 which connects to one end of said strip line.

17. A magnetic field sensor according to claim 1,
2 characterized in that a characteristic impedance of said
3 strip line is equal to that of a transmission line that
4 relays said strip line to a high-frequency cable.

18. A magnetic field sensor according to claim 1,
2 characterized in that all said coil forming elements are
3 wound in one direction.